HP Performance-Optimized Datacenter User Guide

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Intended audience

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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Site requirements

Optimum environment

Specific environmental requirements must be met to provide optimum performance with minimum maintenance for your unit.

HP provides the *HP Performance-Optimized Datacenter Site Requirements Information* document to learn about these requirements and plan your configuration more efficiently. The latest version of the guide is available on the HP website (http://www.hp.com/go/pod).

Location considerations

The HP POD can be located either inside or outside your facility.

If you decide to remove the HP POD from the trailer, it must be installed on a flat, level surface capable of supporting up to 110,000 lb.

Consider the proximity to existing facility utilities (power and water) when choosing the final location.

A site map with the final location of the HP POD, final location of the connection kit, final location of the water distribution kit, facility connection points, and any obstructions must be provided to HP prior to scheduling your delivery and installation.

For more specific power, water, and electrical considerations, see the *HP Performance-Optimized Datacenter Site Requirements Information* document on the HP website (http://www.hp.com/go/pod).

POD exterior dimensions and weight

The HP POD is approximately 12.2 m (40 ft) long, 2.4 m (8 ft) wide, and 2.0 m (9.5 ft) tall.

The HP POD weighs approximately 11,340 kg (25,000 lb) when it is empty and can weigh up to 49,895 kg (110,000 lb) fully loaded.

Before the arrival of your HP POD, verify that the location you have chosen can adequately support the size and weight of the HP POD.

Moving the HP POD

IMPORTANT: If you move the HP POD on your own, it will void your warranty.

If you choose to move the HP POD to a new location, contact HP before attempting to move the HP POD. HP can provide detailed instructions and/or services for shutting down and moving the HP POD.

System utilities

Your site location must accommodate the following utilities:

- Cooling water
- Power
- Drain (optional)

Available to connect to central facility infrastructure

- BMS via BacNet protocol
- Security system
- Convenience outlet power
- Site networking connection
- Domestic water for humidifier (optional)

Transformer, switchboard, and water distribution kit locations

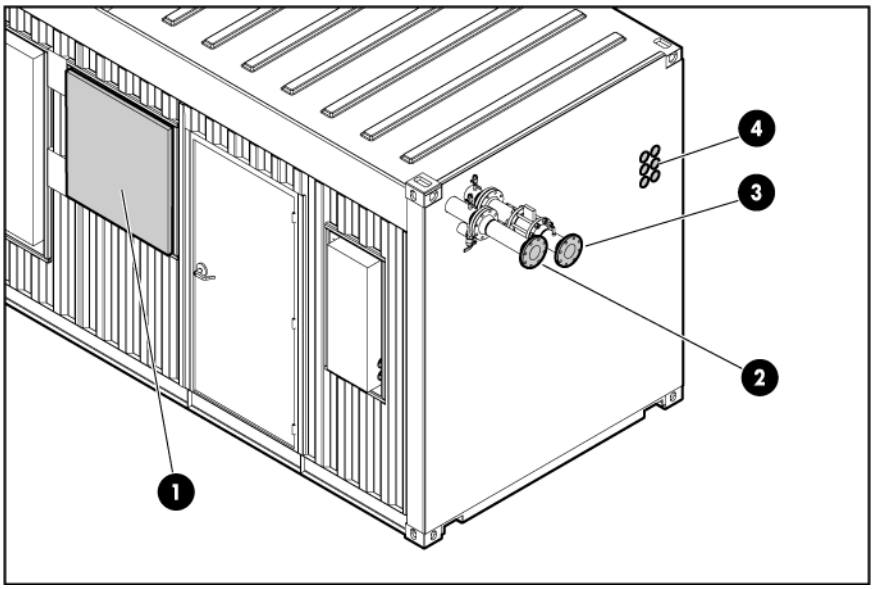
If you choose to purchase the kits, consider:

- Distance from the facility utilities
- Distance from the HP POD

The transformer and switchboard can be installed within 3 m (10 ft) of the HP POD during normal installation. The transformer and switchboard can be installed over 3 m (10 ft) from the HP POD, but this requires additional planning and costs. HP recommends installing the transformer and switchboard no more than 30 m (98 ft) from the HP POD.

The water distribution kit can be installed within 3 m (10 ft) of the HP POD during normal installation. The water distribution kit can be installed over 3 m (10 ft) from the HP POD, but this requires additional planning and costs. HP recommends installing the water distribution kit no more than 30 m (98 ft) from the HP POD.

HP POD connection locations



Callout	Connection
1	Main input power junction box

Callout	Connection
2	Chilled water return connection
3	Chilled water supply connection
4	IT cable portals*

*There are identical IT cable portals on the left side of the HP POD.

Work space requirements

IMPORTANT: Failure to comply with the work space requirements can result in failed authorization to power your HP POD by local electrical inspectors.

Work platform requirements

NOTE: The base of the work platform should be level with the base of the HP POD. If you choose to leave the HP POD on a trailer, a work platform is required.

The area outside of the HP POD directly in front of the panels must have a work platform. The specifications of the work platform are:

- The work platform must be a minimum of 1 m (3 ft) wide for standard platforms, and 1.1 m (3.5 ft) wide if the work platform is constructed of grounded metal.
- The work platform surface must be <2.0 m (6.6 ft) from the center of any circuit breaker actuator handle.

Work space lighting

Make sure that the HP POD, transformer, switchboard, and water distribution kit are installed in a well lit area that complies with local work space lighting requirements, per code regulations.

Environmental considerations

- Install a properly engineered awning to enable access to the building in adverse weather conditions.
- Install lightning protection for the HP POD.
- Make sure that the HP POD is properly grounded.
- Avoid placing the HP POD directly along a drainage path or in an area prone to flooding.
- Raise the HP POD slightly off the ground, or set it on a higher point of elevation. In low elevated areas, HP recommends setting the HP POD on a concrete housekeeping pad.
- Avoid placing the HP POD directly in the path of external heat loads such as a diesel generator or an air cooled chiller.

Temperature considerations

The standard operating temperature for the HP POD is from -17.8°C to 54.4°C (0°F to 130°F).

If you choose to purchase the additional insulating paint ("Additional insulation" on page 44), the operating temperature of the HP POD is from -28.9°C to 54.4°C (-20°F to 130°F).

Leveling requirements

The site location for the HP POD must be level +/- 0.5 degree tolerance.

Grounding requirements

IMPORTANT: Before installing the HP POD, consult your local AHJ for applicable codes and to review site-specific location guidelines.

The HP POD must be grounded in accordance to local electric code. HP recommends grounding the HP POD, the transformer and switchboard, and the water distribution kit to your ground grid system for full protection.

Lightning protection

If the HP POD is installed in an outdoor environment, HP recommends hiring a lightning protection consultant to evaluate potential lightning risks and assess possible HP POD lightning protection schemes.

Component documentation

The *Operations and Maintenance Manual*, that includes all contractor-installed component documentation and all server and IT equipment documentation is delivered with your HP POD.

Safety considerations

Safety information

The HP POD has been listed to the UL 69050 as an Information Technology Product and Classified according to the National Electric Code, NFPA-70, 2008.

The HP POD is not suitable for long term human occupancy.

The HP POD has service access areas for periodic maintenance and service, only to be used by owner authorized personnel specifically trained in the maintenance and service of the HP POD IT components.

The safety information is specific to the people operating and maintaining the components of the HP POD.

IMPORTANT: All plumbing to and from the HP POD must be completed by a licensed plumber.

IMPORTANT: All wiring in and around the HP POD must be completed by a licensed electrician.

Operator safety

WARNING: Hearing protection must be worn at all times when working in or around the HP POD.

WARNING: Any water that drains around the HP POD causes a potential slip hazard. Use caution where slip hazards are present.

Component health

CAUTION: If the cooling water stops flowing into the HP POD:

- Turn off all IT equipment
- Open the HP POD doors, if weather permits
- View the BMS alarm conditions

CAUTION: Do not put anything inside any of the electrical busways, except the approved connections to the HP busway dropboxes.

CAUTION: During operation of the HP POD, the overhead fan doors must remain closed.

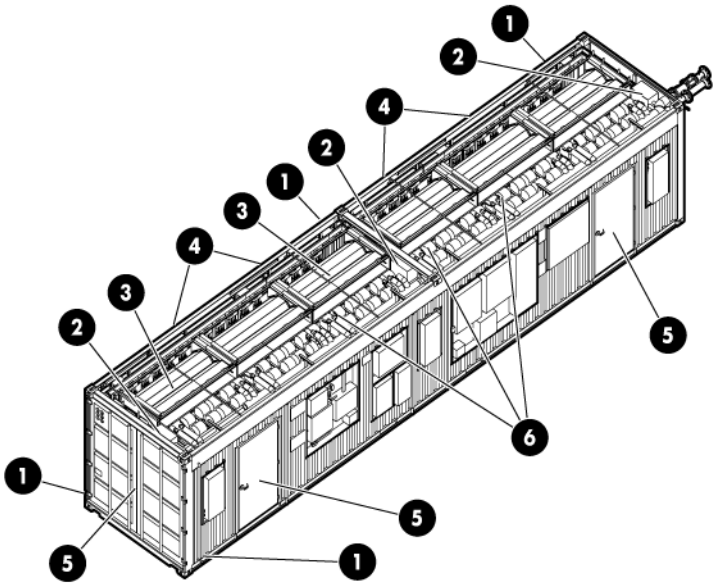
CAUTION: All customer supplied water fittings must be composed of carbon steel, stainless steel, or copper. Do not use cast iron, aluminum, or PVC fittings.

CAUTION: During operation, avoid leaving the HP POD doors open, to minimize condensation conditions.

Component identification

HP POD components

HP POD components

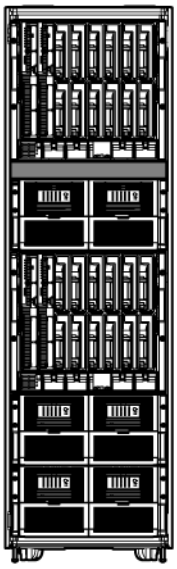


Item	Component	Description
1	Drain lines	Collect water from the drain pans and removes it from the HP POD
2	Electrical busways	Main source of distributing power throughout the HP POD
3	Heat exchangers	Use cooling water to cool the air
4	Rear service doors	Enable access to the rear of the rack-mounted components
5	Entrance doors	Enable access to the front of the rack-mounted components
6	Fan units	Circulate the cool air throughout the HP POD

Rack components

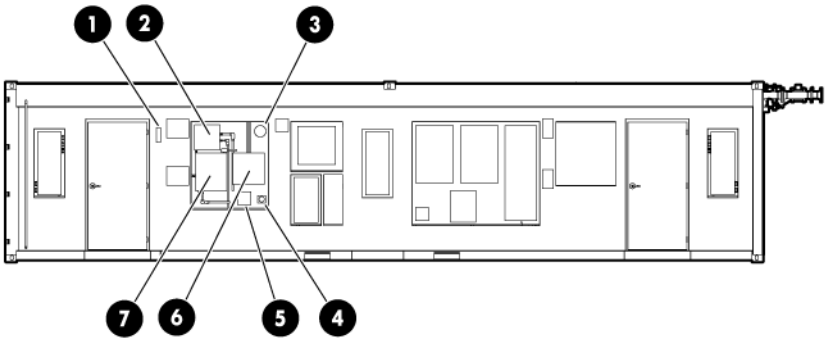
There are 22 configured racks inside the HP POD. The following diagram is an example of a fully-loaded and configured rack. Your rack might include different servers and components.

If any of the racks within the HP POD contain empty U space, you must use a heavy duty filler panel to avoid compromising the integrity of the hot and cold aisle temperatures.



HP POD emergency components

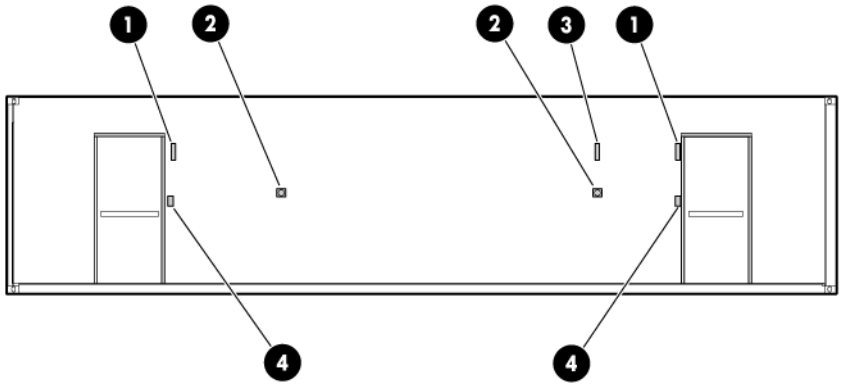
External emergency components



Item	Component	Description
1	Fire strobe and horn	Indication of a fire alarm condition within the HP POD.
2	EPO panel	Contains controls and status indicators for the EPO system.
3	EPO alarm lamp (red)	Activated when an EPO alarm button is pressed.
4	EPO button	Pressing this button cuts off all power to the HP POD and activates the EPO alarm lamp.
5	Fire alarm XFMR*	Fire alarm transformer
6	ASSD panel	Samples the air in the HP POD, monitoring smoke
7	Fire alarm control panel	Contains controls and status indicators for the fire alarm system.

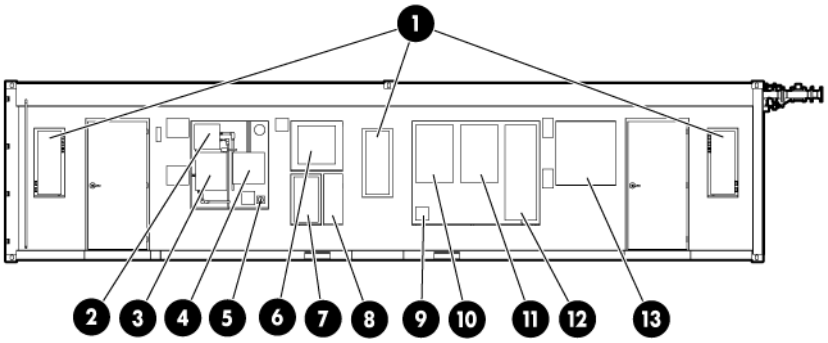
*Optional component

Internal emergency components



Item	Component	Description
1	Internal fire strobe and horn (x2)	Indication of a fire alarm condition within the HP POD.
2	EPO button (x2)	Pressing one of these buttons cuts off all power to the HP POD and activates the EPO strobe.
3	EPO strobe	Activated when an EPO button is pressed.
4	Fire alarm pull switch (x2)	Pulling one of these switches activates the fire strobes and horns.

HP POD panel locations



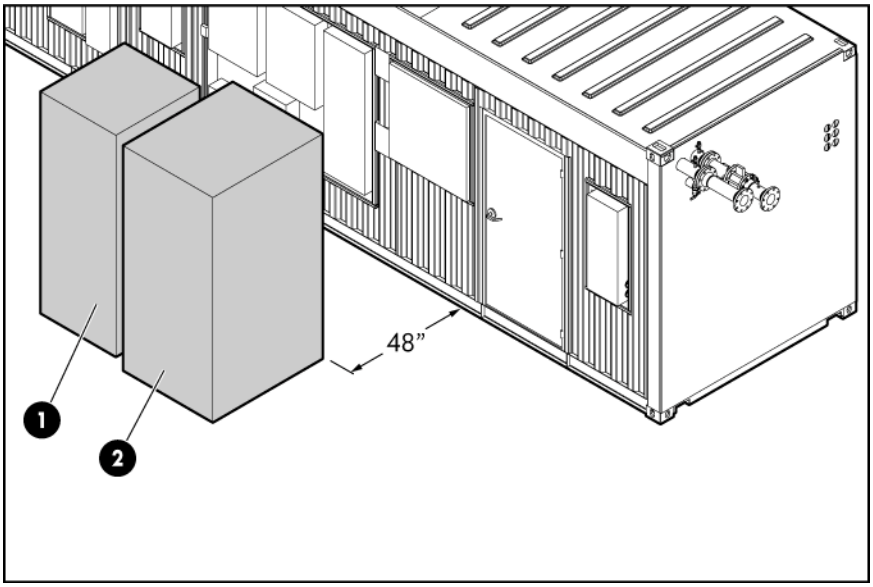
Item	Component	Description
1	Electrical busway enclosed circuit breaker (on page 36)	400A enclosed circuit breakers that powers the electrical busways: • Two electrical busway panels are activated in the standard HP POD. • Three electrical busway panels are activated in the high density HP POD.
2	EPO panel (on page 36)	Contains controls and status indicators for the EPO system
3	Fire alarm panel ("Fire alarm control panel" on page 38)	Contains controls and status indicators for the fire alarm system

Item	Component	Description
4	ASSD panel (on page 36)	Air sampling smoke detection system
5	EPO button	Cuts off all power to the POD and activates the EPO alarm lamp.
6	Security panel ("Security panel location" on page 39)	Reserved for installing interface and power requirements for any optional security devices installed.
7	EPMS panel* ("EPMS panel" on page 38)	Electrical power monitoring system
8	Humidifier ("Humidifier (optional)" on page 44)*	Maintains the humidity inside the HP POD within a set range to minimize static electricity.
9	Auxiliary Land power*	Provides auxiliary power for the BMS or convenience outlets. 120V owner-provided power.
10	BMS panel (on page 36)	Building Management System
11	Fan control (FC) panel ("Fan control panel" on page 38)	Circuit breakers that control the fan units
12	House panel (on page 38)	120A electrical panel board providing auxiliary HP POD electrical requirements
13	Junction Box	Main input box for incoming electrical feeder cables

*Optional component

Transformer and switchboard components (optional)

NOTE: The transformer and switchboard must be a minimum of 1.2 m (48 in) away from the HP POD.

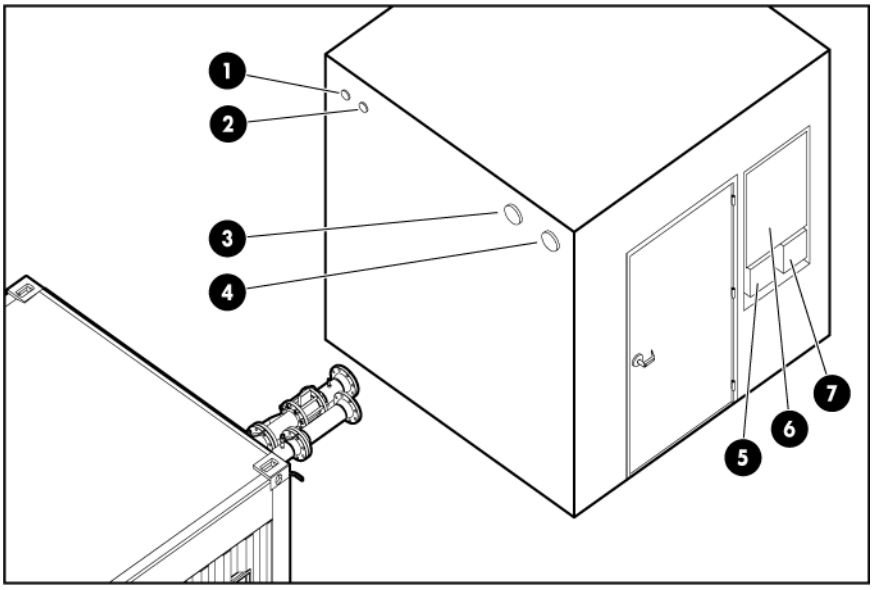


Item	Component	Description
1	Switchboard	Distributes power to each of the electrical busways breakers and the House panel

Item	Component	Description
2	Transformer	Transforms power from 480V at your facility to the 415V needed for the HP POD

Water distribution kit components (optional)

The water distribution kit is an optional component that is composed of two closed-loop systems: one for the facility water and one for the HP POD water. The water for the HP POD is supplied through the fill tank and chemically treated prior to entering the HP POD to ensure adequate water quality.



Item	Component	Description
1	Facility supply connection	Connection to the facility supply line
2	Facility return connection	Connection to the facility return line
3	HP POD supply line	Connection to the HP POD supply line
4	HP POD return line	Connection to the HP POD return line
5	Panel disconnect	Power disconnect for water distribution kit components
6	400A controller board	400A electrical panel board providing auxiliary electrical requirements
7	Panel disconnect	Power disconnect for water distribution kit components

Installation

HP POD contents

The following items are shipped with the HP POD, and are delivered at the time of your HP POD delivery and installation.

Standard 40-ft HP POD

Component	Quantity	Part number
Either of the following: • HP Transformer and HP Switchboard • Engineer your own site power for a minimum of 1200A	Not applicable	Not applicable
Either of the following: • HP Water distribution kit • Engineer your own site water for a minimum of 240 gal/min	1	AH988A
HP 50U rack	22	AN982A
Side panel 50U kit	1	AN991A
50U rack bracket kit	21	AP014A
Either of the following busway dropbox and PDU kits: • Single phase HP POD busway dropbox kit • Single phase HP POD PDU bracket kit -or- • Three phase HP POD busway dropbox kit • Three phase HP POD PDU bracket kit	 15 44 15 44	 AP912A AQ684A AS613A AQ683A
Rack interface seal kit	21	AP013A

High density 40-ft HP POD

Component	Quantity	Part number
Either of the following: • HP Transformer and HP Switchboard • Engineer your own site power for a minimum of 1600A	Not applicable	Not applicable
Either of the following: • HP Water distribution kit • Engineer your own site water for a minimum of 240 gal/min	1	AH988A
HP 50U rack	22	AN982A

Component	Quantity	Part number
Side panel 50U kit	1	AN991A
50U rack bracket kit	21	AP014A
Either of the following busway dropbox and PDU kits: • Single phase HP POD busway dropbox kit • Single phase <sci)short_name> PDU bracket kit -or- • Three phase HP POD busway dropbox kit • Three phase HP POD PDU bracket kit	 30 88 30 88	 AP912A AQ684A AS613A AQ683A
Rack interface seal kit	21	AP013A

The HP POD is delivered with heavy duty filler panels installed in every empty U space of the racks. However, HP recommends purchasing additional heavy duty filler panels (AF073A) to prevent compromising the integrity of the cold aisle set point temperature when IT equipment is removed for upgrades or maintenance.

The quantity and model of PDUs included with your HP POD are dependent on the IT equipment load they are supporting.

Preinstallation checklist

△ **CAUTION:** Tighten the electrical busway connections after the HP POD is in its final location and before you begin the installation process.

Before you begin the installation of your HP POD, verify the following action items have been completed:

- All components are delivered to your facility.
- The HP POD, transformer, switchboard, and water distribution kit are in their final locations.
- You must have facility power at your final location. You can provide the connection cables from the facility to the transformer and switchboard or purchase connection cables from HP at additional costs.
- You must have facility water at your final location. You can provide the connection hoses from the facility to the water distribution kit or purchase connection hoses from HP at additional costs.
- The HP POD has been properly grounded.

Required tools

- 10-ft ladder (2)
- 6-ft ladder (2)
- Tongue-and-groove pliers with 4.25-in capacity jaws
- Screwdriver set
- Ratchet set
- Diagonal cutters
- Heavy-duty tie wraps

- Pipe wrench

Installing the HP POD using the optional components

The following steps are an overview of the installation procedure for installing a HP POD, using the transformer, switchboard, and the water distribution kit.

You must obtain service professionals to connect your power and water.

IMPORTANT: All wiring in and around the HP POD must be completed by a licensed electrician.

IMPORTANT: All plumbing to and from the HP POD must be completed by a licensed plumber.

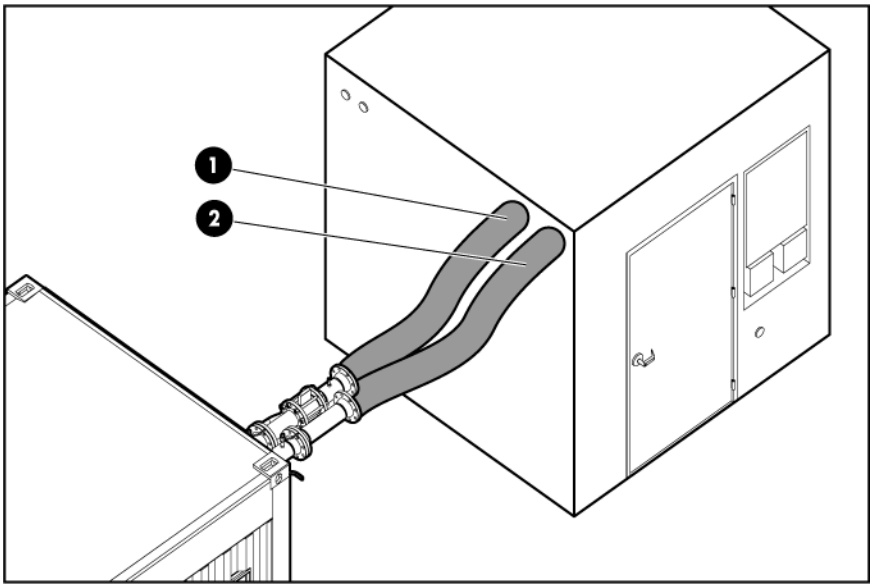
Connecting the water

CAUTION: All customer supplied water fittings must be composed of carbon steel, stainless steel, or copper. Do not use cast iron, aluminum, or PVC fittings.

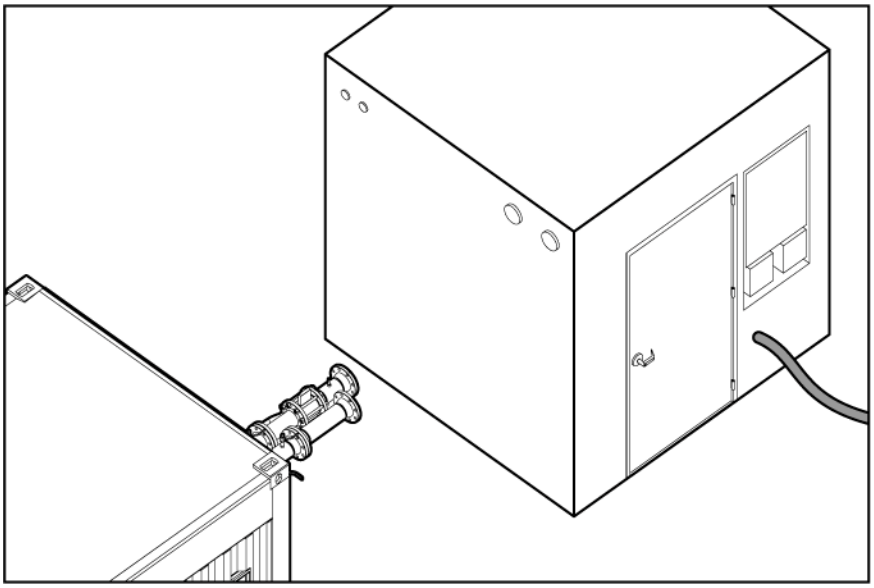
1. Before you connect your facility water to the water distribution kit, flush the cooling water pipes.
   a. Connect water directly to the HP POD.
   b. Allow the water to run until it is clean, flushing any contaminates that might have entered the cooling pipes during shipping or delivery.

      - **NOTE:** For quick reference, the water hoses are labeled with green tape and white arrows pointing in the direction of the water flow.

2. Connect the 4-in return and supply lines from the water distribution kit to the HP POD.



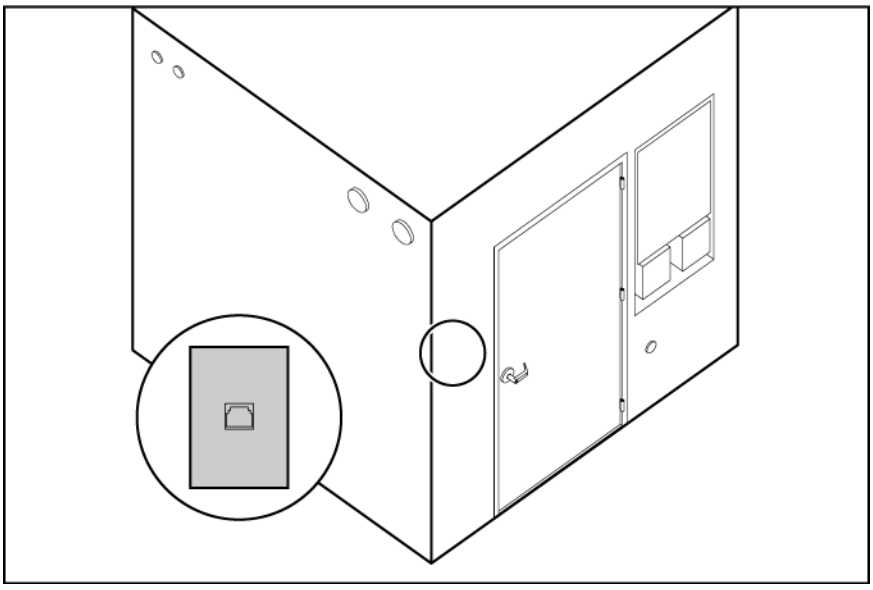
3. Pump domestic or industrial water into the water distribution kit closed-loop system fill tank, according to the water quality requirements (on page 30).



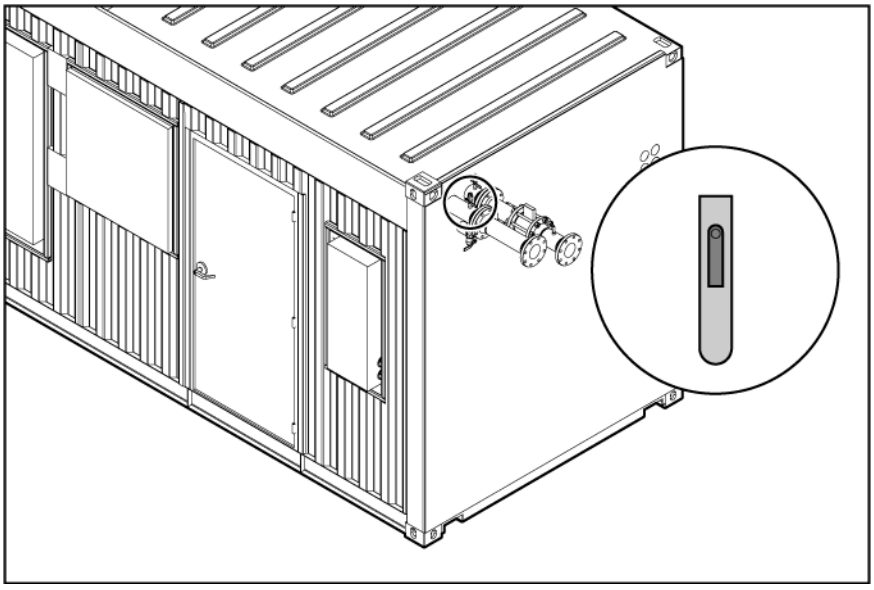
NOTE: The HP POD pipe design is rated for a maximum pressure rating of 150 psi.

4. Verify that your facility water pressure is within the acceptable range (20-25 psi).
5. Initiate the system pumps on the water distribution kit:
   - Manually initiate the system pumps with the main power switch located on the pumps.

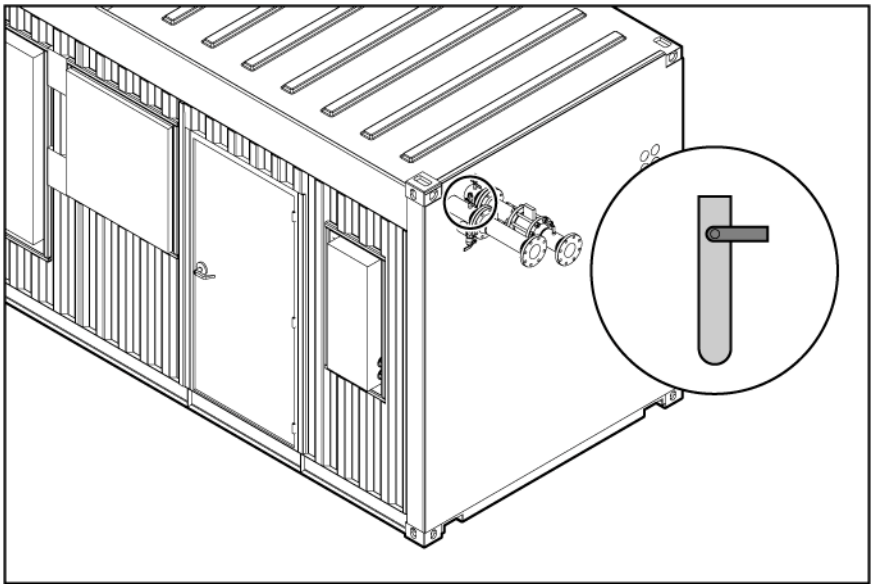
     - or -
   - Connect the water distribution kit to the BMS system, and initiate the system pumps through the BMS.



6. Open the bleeder valve on the HP POD return line.



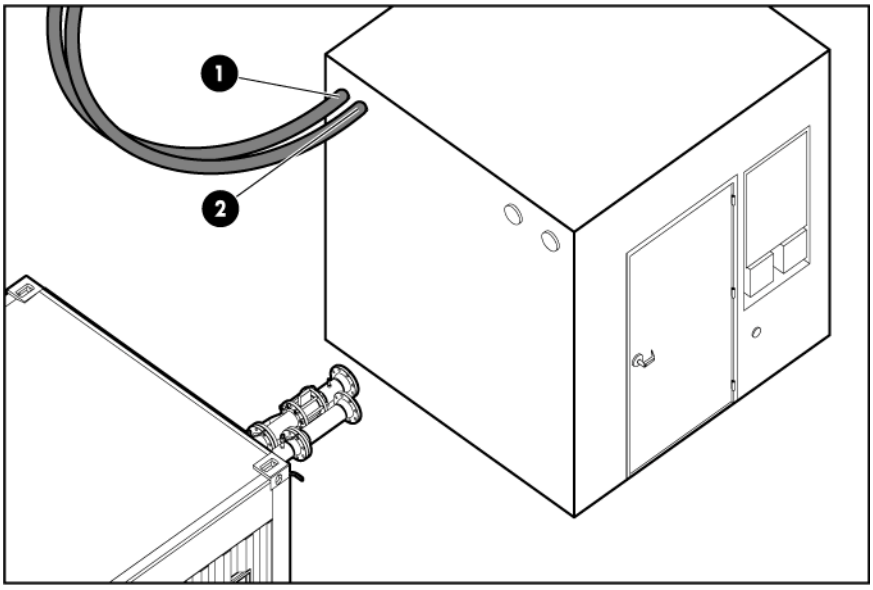
7. When the tank is full and there is no more air coming out of the bleeder valve, close the bleeder valve on the HP POD return line.



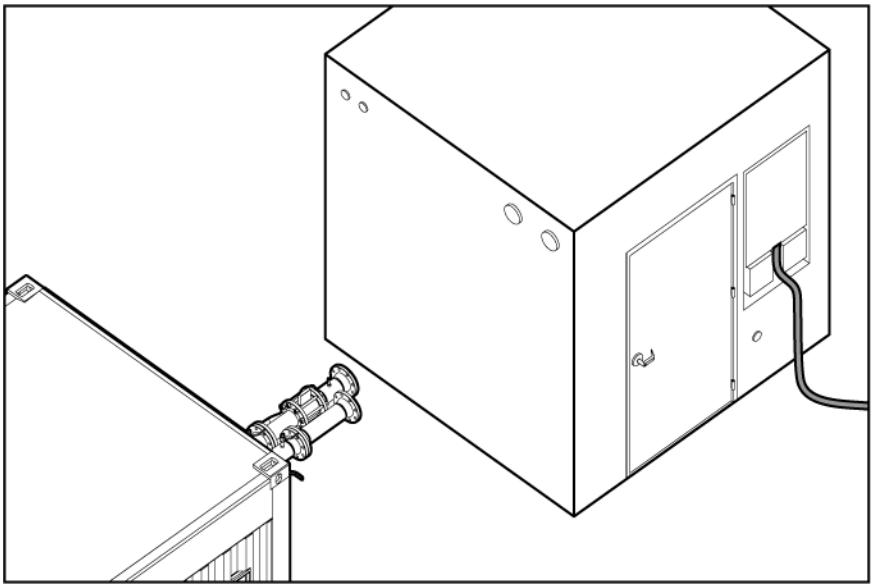
8. Verify that your facility water pressure is within the acceptable range (20-25 psi).

- **NOTE:** For quick reference, the water hoses are labeled with green tape and white arrows pointing in the direction of the water flow.

9. Connect the facility supply and return lines to the water distribution kit.

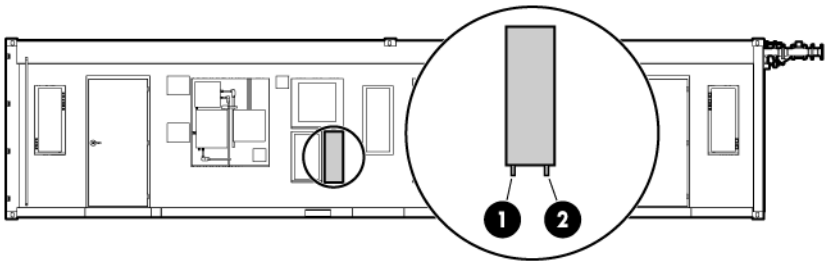


10. Connect the water distribution kit to your facility power source.

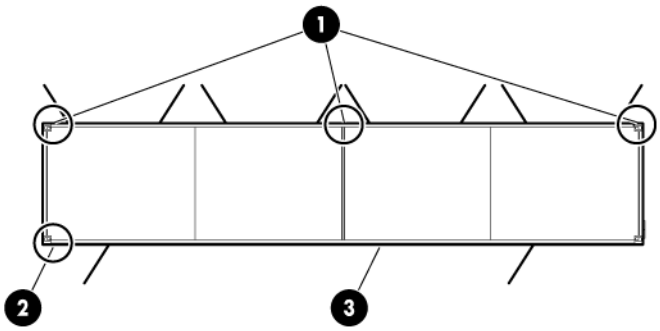


IMPORTANT: The water supply to the humidifier must be heat-traced to prevent freezing.

11. (Optional) Connect the HP POD humidifier to the domestic or industrial water drain (1) and supply (2) lines. For more information about the humidifier, see the product documentation.



12. Perform one of the following:
    - If your HP POD is located inside, HP recommends connecting each of the drains to the local drain line.
    - If your HP POD is located outside, you can choose to connect to the local drain line, or allow the water to drain off freely in your location. For more information, see Drain locations ("HP POD drains" on page 28).



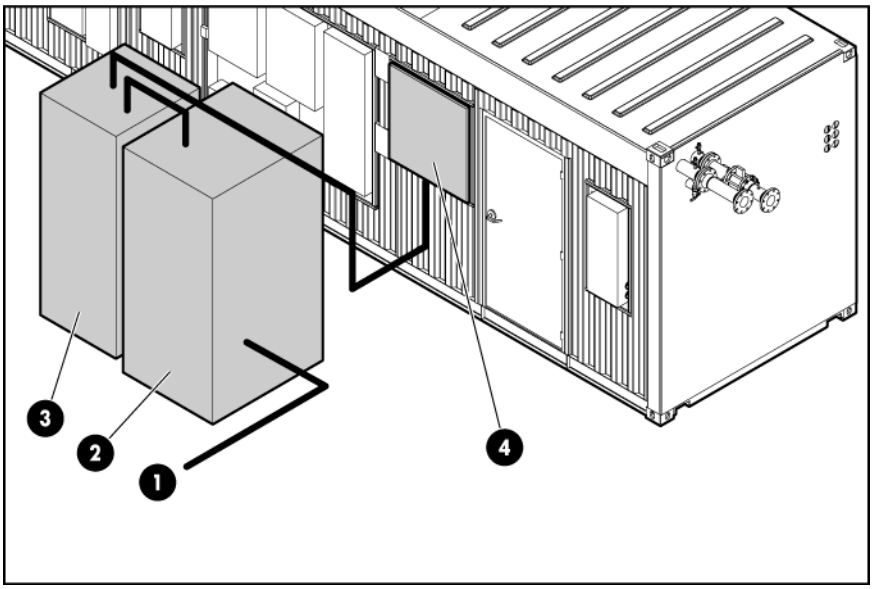
Connecting the power

IMPORTANT: A licensed electrician must connect the power according the local electric code, consistent with supplier and consulting engineer drawings.

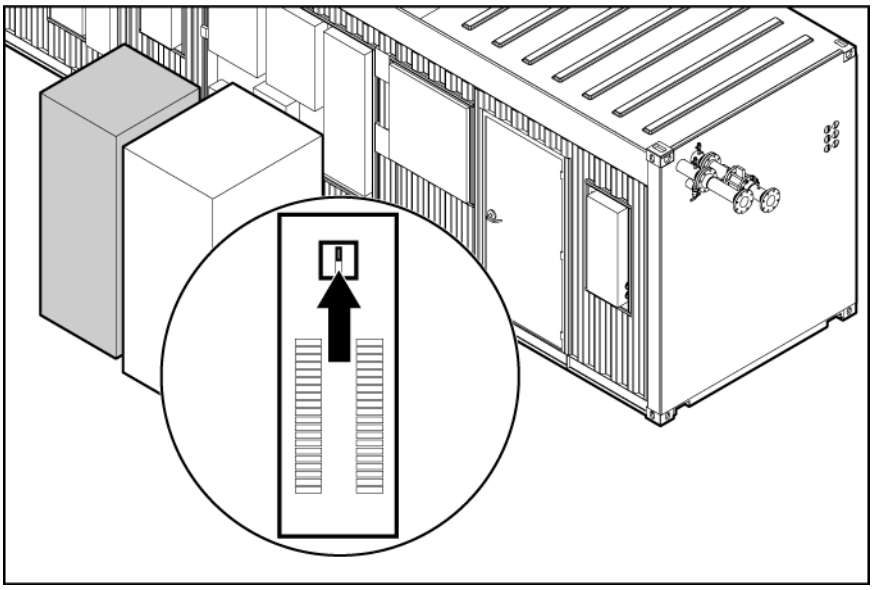
1. Verify that the HP POD, transformer, and switchboard are in their final locations.
2. Make all connections:
    - Connect the main power leads from your facility to the transformer (1 to 2).

      Each connection is labeled with colored tape, according to local standard requirements.
    - Connect the transformer to the switchboard (2 to 3).
    - Connect the three 3-in flexible conduits from the switchboard to the junction box on the HP POD (3 to 4).

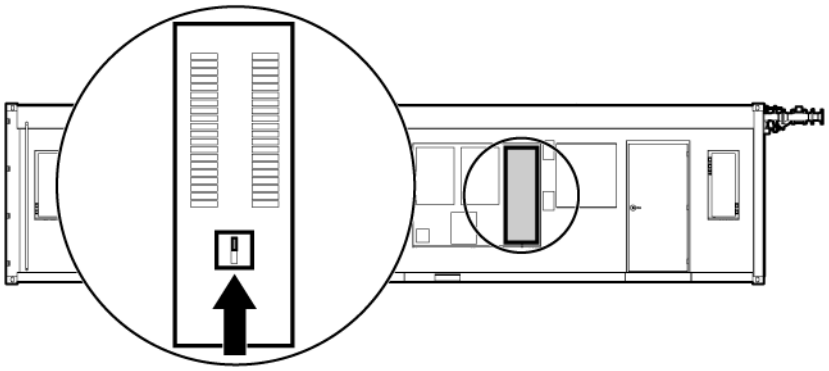
Each connection is labeled. Two of the conduits power the electrical busway breakers and one powers the house panel.



3. Turn on facility power.
4. Close the three main breakers on the switchboard.



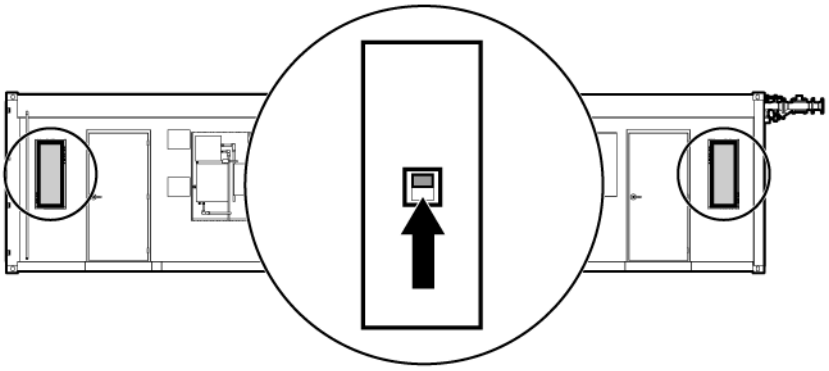
5. Close the main breaker in the House panel on the exterior of the HP POD.



6. Close the remaining breakers in the House panel one by one, following the panel schedule on the inside of the House panel.

> **NOTE:** If you are installing a high density HP POD, you must also close the main breaker in the electrical busway 3 panel.

7. Close the main breakers in the electrical busway 1 and electrical busway 2 panels.



8. Inside the HP POD, close the breaker on each drop box that is connected to a rack of IT components.
9. Power up your remaining racks and IT components following your standard IT startup procedure.

Commissioning the HP POD

Commissioning your HP POD is an optional service and is customized based on your facility. A typical commissioning process includes the following tests:

- Tighten the electrical busway connections
- Verify accurate electrical installation
- Verify accurate mechanical installation
- Test the operation of the BMS and Cooling controls
- Test the operation of the smoke detection system
- Test the operation of EPO system

- Test the operation of the analog and digital phone system
- Verify initial IT start-up
- Conduct an infrared scan of all electrical connections under the start-up IT load
- Verify accurate cooling under start-up IT load
- Provide the HP POD operation owner training

Cooling system

HP POD cooling system

CAUTION: Contaminated supply water might cause decreased cooling capacity or disruption in service. The supply water must meet the guidelines states in the HP Performance-Optimized Datacenter Site Requirements Information document. Damage caused by contaminated supply water is not covered by the warranty.

The HP POD has 12 heat exchangers that maintain temperature and cool the equipment installed in the HP POD. The HP POD heat exchangers receive chilled water from either the water distribution kit or your facility, cycles the water through the heat exchangers to cool the air, and then the fan units circulate the cool air throughout the HP POD.

To control the fan speed, you must set a cold aisle temperature through the BMS. A predetermined differential pressure setpoint between the hot aisle temperature and cold aisle temperature is factory set, and cannot be altered. The fan units regulate speeds to maintain the cold aisle temperature and differential pressure between the hot and cold aisle. For more information, see Controlling the fan speed (on page 27).

Water supply temperature

If you are using a water distribution kit, water is supplied to the HP POD between 13°C and 24°C (55°F and 75°F). HP recommends that you supply water to the water distribution kit between 4°c and 10°C (40°F and 50°F).

If you are not using a water distribution kit, HP recommends supplying water to the HP POD between 13°C and 24°C (55°F and 75°F).

Controlling the fan speed

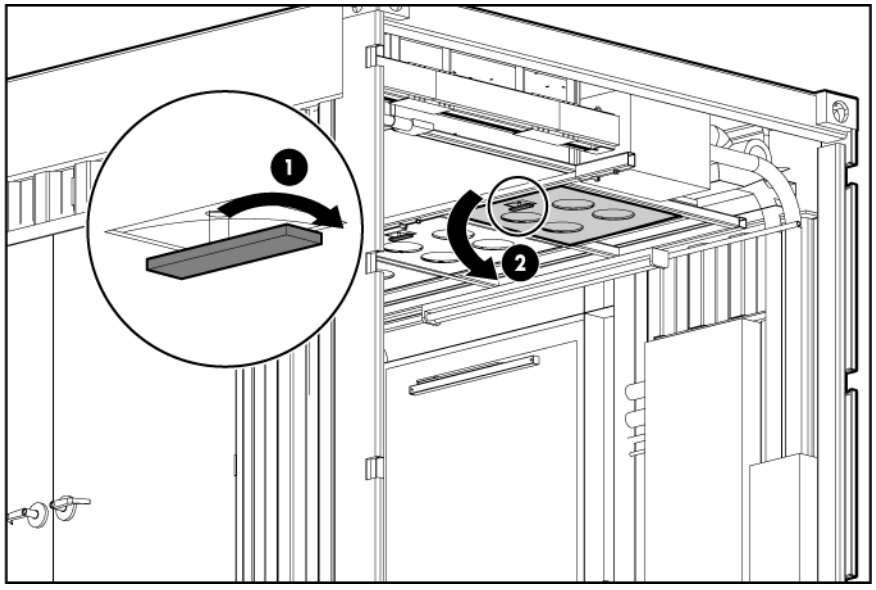
The HP POD fans operate at variable speeds to maintain a predetermined differential pressure setpoint between the hot aisle and the cold aisle. You set your desired cold aisle temperature through your BMS, and the fan speed adjusts to maintain the differential pressure setpoint between the hot and cold aisle temperatures.

You cannot manually adjust the fan speed.

To access the fan units:

1. Unlock the latch for that fan overhead.

2. Pull the overhead down.



Condensation management

> **CAUTION:** During operation, avoid leaving the HP POD doors open, to minimize condensation conditions.

Supply cooling water that is above the dewpoint inside the HP POD to reduce condensation forming on the heat exchangers, and also cold enough to maintain the cold aisle temperature setpoint. If both conditions cannot be met during the HP POD startup, adjust either the cooling water or the cold aisle temperature setpoint above the dewpoint by one degree every fifteen minutes. During this process, the coils act as a dehumidifier and establish conditions inside the HP POD for sustained operation. Significant amounts of condensation might drain from the HP POD during the startup process, if the conditions inside the HP POD are very warm with high humidity.

During normal operation, some condensation might form on the heat exchangers, and it will be collected in the heat exchanger drip tray. The drip trays then collect and drain through the condensate drains out of the HP POD.

HP recommends connecting condensate drains on the HP POD to a facility drain to prevent the collection of water near the HP POD.

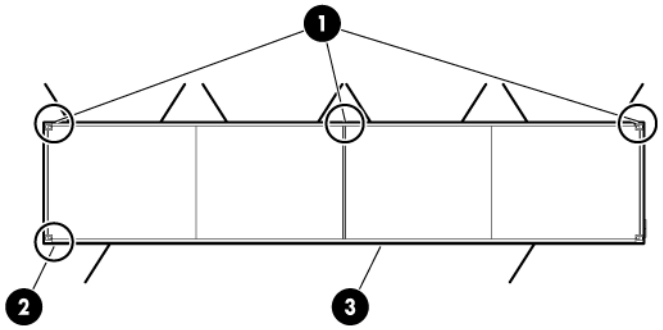
There are three 1.9 cm (¾ inch) condensate drain outlets across the rear of the HP POD directly connected to the heat exchanger drip trays. The water main external drain is located at the front, left corner of the HP POD. A fifth drain is located on the (optional) humidifier. For specific drain locations, see Drain locations ("HP POD drains" on page 28).

To avoid excessive buildup of condensate and to conserve energy, consider raising the cooling water temperature above the dewpoint to manage condensation while maintaining the necessary cooling capacity.

HP POD drains

WARNING: Any water that drains around the HP POD causes a potential slip hazard. Use caution where slip hazards are present.

Water from natural condensation might form. Condensation from the heat exchangers flow to the three condensate drains across the rear of the HP POD (1). The water main drain catches any water from a water main leak (2). The humidifier drain removes excess moisture from the air (3).



Item	Component
1	Heat exchanger condensate drains
2	Water main supply/return drain
3	Humidifier drain

IMPORTANT: You might have to pipe directly to your local storm or sanitary drain, depending on local jurisdiction.

If your HP POD is located indoors, you can connect to an external drain line. If your HP POD is located outdoors, the drained water will simply drip from the HP POD drains out the back of the HP POD.

HP recommends connecting the condensate drains on the HP POD to a facility drain to prevent collection of water near the HP POD.

Leak detection

If too much water accumulates in a drain tray, an alarm is triggered and sent through the BMS, indicating that there might be a leak. For more information about alarms, see BMS alarms (on page 41).

Water quality requirements

Water quality requirements and specifications

- Closed-loop water must not contain any lime scale deposits or loose debris.
- The water must have a low level of hardness, particularly a low level of carbon hardness. Additionally, the water must not be so soft that it attacks the materials with which it comes into contact.
- The chilled water temperature to be supplied to the HP POD is 12° to 24°C (55° to 75°F). Freezing water might cause a blockage and damage to the unit. In outside locations subject to freezing temperatures, an additive such as glycol might be necessary to lower the freezing point. However, the heat transfer potential of the water is lower, so the equipment must be derated properly.

Acceptable water quality specifications

Water must be maintained per the following acceptable water quality standards.

Parameter	**Range**
pH	8.0–10
Specific conductance at 25°C (77°F)	0–2500 µmhos/cm
Alkalinity ("M" as $CaCO_3$)	150–1000 ppm
Sulfur (SO_4)	0–150 ppm
Chloride (Cl)	0–100 ppm
Hardness ($CaCO_3$)	0–350 ppm
Calcium hardness ($CaCO_3$)	0–200 ppm
Magnesium hardness ($CaCO_3$)	0–150 ppm
Copper (Cu)	< 0.20 ppm
Iron (Fe)	< 3.0 ppm
Aluminum (Al)	< 0.50 ppm
Sodium (Na)	0–1000 ppm
Silica (SiO_2)	0–150 ppm
Zinc (Zn)	< 1.0 ppm
Manganese (Mn)	< 0.1 ppm
Phosphate Ortho- (PO_4)	< 3 ppm
Bacteria	< 1000 CFU/ml
Suspended solids	< 10 ppm

If your water is out of range, consult a water quality expert.

Frost damage

To avoid frost damage, the water temperature must not be allowed to fall below the minimum permissible temperature of +4 °C (+39.2 °F) at any point in the water cycle.

The water cycle must be drained completely using compressed air before storage or transportation at freezing temperatures or below.

Plumbing materials to avoid

Do not use the following materials in a closed water system:

- Oxidizing biocides
- Aluminum components
- Brass components with high levels of zinc
- Non-stainless steel Iron components

Water precautions

Take the following precautions before installation of the HP POD:

- Verify that all foreign matter and particulates are flushed from the system.
- Evaluate the short-term and long-term system requirements against the available water capacity.
- Ensure that the chilled water loop is properly designed for liquid cooling systems and is separate from the sanitary water systems in your building (bathroom, sink, drinking water).
- Ensure facility managers understand the additional load being added to the chilled water supply of the building. Be aware that the added heat load might affect other components being cooled by the chilled water plant.

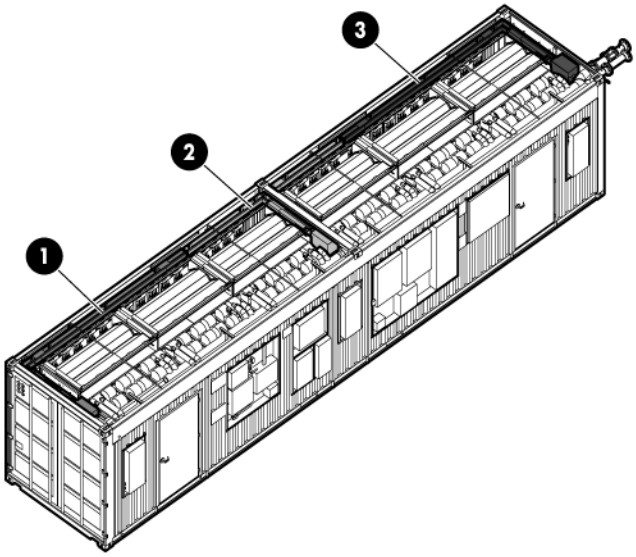
Water temperature

Without a water distribution kit, the temperature of the water supplied to the HP POD must be 12° to 24°C (55° to 75°F). Freezing water might cause a blockage and damage to the unit.

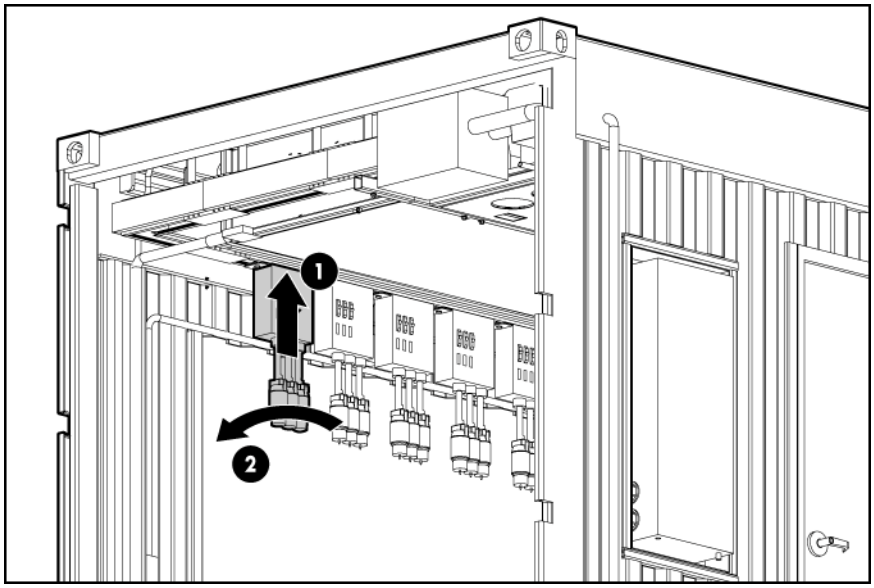
Power management

Electrical busway

The electrical busway is a modular, overhead electrical distribution system that supplies power to the HP POD IT loads. There are two electrical busways in the standard HP POD (1 and 3) and three electrical busways in the high density HP POD (1, 2, and 3).



Each PDU is powered by the dropboxes attached to each of the electrical busways.

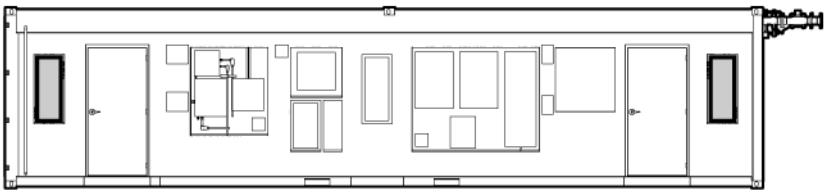


Disabling power

- To disable power to a single PDU, turn off the main switch on that PDU.
- To disable power to a single rack, open the main breaker on the dropbox connected to the electrical busway.
- To disable power to a single electrical busway, open the appropriate main breaker for that busway on the corresponding electrical busway panel outside of the HP POD.

Power distribution

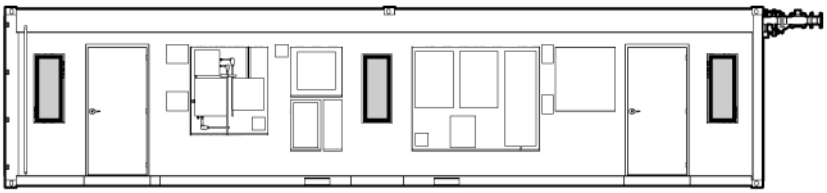
The standard HP POD is powered by two electrical busways on the ends of the unit.



Standard HP POD

Feature	Specification
Number of busways	2
Frequency	60Hz
Amps (per busway)	400A
Neutral Ampacity (per breaker)	480A
Amps derated percentage	20%
Max usable amps (per busway)	320A
Voltage (per busway)	415V
Grounding	Aluminum casing
Phases	3

The high density HP POD includes an additional electrical busway in the center of the unit.



High density HP POD

Feature	Specification
Number of busways	3
Frequency	60Hz
Amps (per breaker)	400A
Neutral Ampacity (per breaker)	480A
Amps derated percentage	20%
Max usable amps (per busway)	320A
Voltage (per busway)	415V
Grounding	Aluminum casing
Phases	3

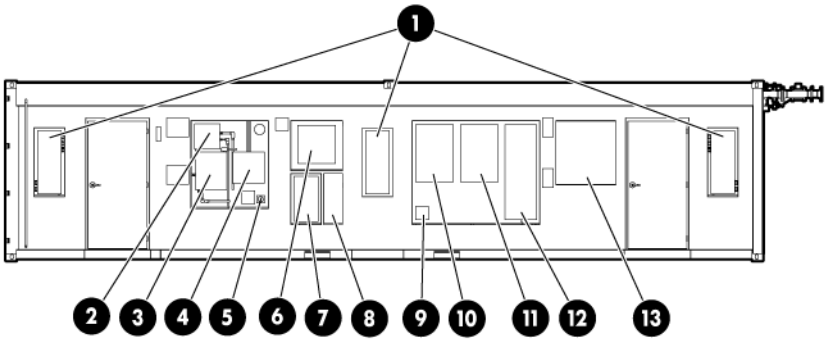
Rack power

Power is provided to each of the rack by PDUs. The PDUs can be moved around the HP POD to support component power requirements. The PDUs are powered by the drop boxes attached to each electrical busway.

For more information regarding power shortages to the PDUs or electrical busway drop boxes, see Troubleshooting (on page 49).

Panels

The following panels are on the exterior of the HP POD.



Item	Component	Description
1	Electrical busway enclosed circuit breaker (on page 36)	400A enclosed circuit breakers that powers the electrical busways: • Two electrical busway panels are activated in the standard HP POD. • Three electrical busway panels are activated in the high density HP POD.
2	EPO panel (on page 36)	Contains controls and status indicators for the EPO system
3	Fire alarm panel ("Fire alarm control panel" on page 38)	Contains controls and status indicators for the fire alarm system
4	ASSD panel (on page 36)	Air sampling smoke detection system
5	EPO button	Cuts off all power to the POD and activates the EPO alarm lamp.
6	Security panel ("Security panel location" on page 39)	Reserved for installing interface and power requirements for any optional security devices installed.
7	EPMS panel* ("EPMS panel" on page 38)	Electrical power monitoring system
8	Humidifier ("Humidifier (optional)" on page 44)*	Maintains the humidity inside the HP POD within a set range to minimize static electricity.
9	Auxiliary Land power*	Provides auxiliary power for the BMS or convenience outlets. 120V owner-provided power.
10	BMS panel (on page 36)	Building Management System
11	Fan control (FC) panel ("Fan control panel" on page 38)	Circuit breakers that control the fan units
12	House panel (on page 38)	120A electrical panel board providing auxiliary HP POD electrical requirements
13	Junction Box	Main input box for incoming electrical feeder cables

*Optional component

ASSD panel

The ASSD panel draws air from the piping network inside the HP POD and monitors the smoke levels in the air. If smoke is detected, the ASSD panel automatically sends an alarm to the prewired Fire Alarm Control Panel.

No user interface settings are required. Interface is established through the Fire Alarm Control Panel.

For more information, see the product documentation included in the *Operations & Maintenance Manual* ("Component documentation" on page 9).

BMS panel

The BMS panel enables you to connect the HP POD to your building management system. You must bring an Ethernet cable through the internal passway to connect to the BMS panel.

There is no external user access to the HP POD BMS panel, and all interface settings are controlled through your facility BMS.

For more information, see Connecting the HP POD to the BMS (on page 40).

Electrical busway enclosed circuit breaker

The electrical busway panels are enclosed circuit breakers that provide power to each of the electrical busways. For more information, see Electrical busway (on page 32).

EPO Panel

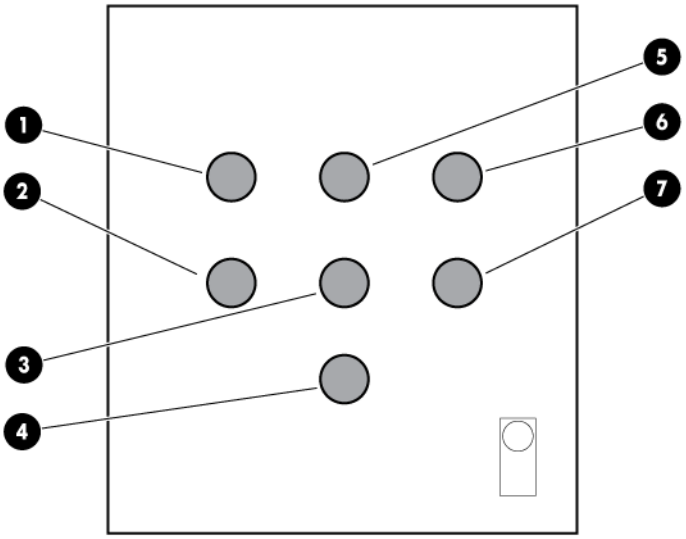
IMPORTANT: If the remote powered 120V branch circuits are operational, they are not turned off during an EPO shutdown.

The EPO panel contains controls and status lamps for the EPO system, which enables all power in the HP POD to be turned off except for emergency lighting. Power to the EPO panel is single-phase 240V AC, provided by the house panel.

Two EPO alarm buttons for directly shutting off non-emergency HP POD power are located inside the HP POD, and one EPO alarm button is located on the outside of the HP POD.

To check that the EPO alarm buttons and alarms are functional, switch to Test mode and then press an EPO alarm button. This procedure activates the EPO alarms without cutting off power to the HP POD.

To enable remote access to the EPO system, switch to Bypass mode.



Callout	Component	Description
1	Power On LED	Indicates the EPO is functional, and operating in Test mode, Armed mode, or Bypass mode.
2	EPO Armed mode LED	Indicates the EPO is operating in Armed mode.
3	Reset button	Resets the EPO system after an EPO alarm has been triggered.
4	Three way key-operated switch	Sets the EPO operating mode (Test, Armed, or Bypass).
5	System alarm/ EPO shutdown (red)	Indicates an EPO alarm has been triggered and non-emergency HP POD power has been shut off.
6	System Test mode LED (amber)	Indicates the EPO is undergoing a system test.
7	EPO Bypass mode LED (green)	Indicates the EPO is in Bypass mode.

After an EPO alarm, reset the EPO system:

1. Use the button key release mechanism to restore the EPO alarm buttons to their normal state.
2. Reset the main breaker in the House panel.
3. Reset the electrical busway breakers.
4. Press the Reset button on the EPO panel.

EPO modes

The EPO panel operates in three modes: Armed, Test, and Bypass. The operating mode is determined by the status of a key-operated selector switch on the EPO panel. The switch status can be reported to a monitoring system that is external to the POD.

Armed mode—Pressing a red EPO button on the POD causes the following events:

- The red System Alarm/EPO Shutdown light on the EPO panel illuminates to indicate that an EPO switch has been activated. (This light remains illuminated until all EPO buttons are restored to their normal state by means of a key release mechanism, and the Reset button on the EPO panel is pressed.)
- The EPO activated relay is energized and sends a signal to the EPO panel to energize the associated control relays.
- The control relays within the EPO panel shut down the affected circuit breakers in the POD.

Test mode—All associated EPO functions are disabled, and the amber System Test Mode light on the EPO panel is illuminated. This mode enables the EPO buttons to be tested without removing power to the POD. When an EPO button is pressed, the EPO Activated relay is energized, and it energizes the associated control relays in the EPO panel. Although the EPO functions are disabled, the horn and strobe alarm are activated. To silence the alarm, press the Reset button on the EPO panel.

Bypass mode—All EPO functions and test functions are disabled. When the EPO panel is operating in this mode, the green EPO Bypass light on the EPO panel is illuminated.

EPMS panel

The electric power managing system (EPMS) is composed of 120V, Nema 515R rated auxiliary power. The panel optionally provides additional power for auxiliary components, mainly the BMS.

- If you connect land power to this panel, the BMS is powered by external land power.
- If you do not connect land power to this panel, the BMS is powered by the House panel.

Fan control panel

The Fan Control panel houses the relay system that controls the fan speeds within the HP POD, based on maintaining the cold aisle temperature set through the BMS.

You do not have to access to the Fan Control panel, and no interface setting is required.

Fire alarm control panel

If you connect your central fire alarm system to the fire alarm control panel, any emergency alarm can be sent directly over your facility alarm system.

For more information about the fire alarm control panel, see the product documentation included in the *Operations & Maintenance Guide*.

House panel

The House panel is a 120A panel board that provides power and electrical requirements to all auxiliary HP POD components.

If a breaker is tripped open, you can access to the outside of the House panel and reset the breakers. You can also reset the HP POD components after an EPO alarm. If one or more breakers continually trip, contact HP ("HP contact information" on page 55).

The standard panel schedule resides inside the panel breaker box and can be referenced when necessary.

Security panel location

If you decide you want to install a security panel, the HP POD has a predesignated location for a security panel.

Building management system

Using a building management system (BMS)

NOTE: If your site does not have a BMS, then BMS data can be sent and viewed to a set IP address, communicating via Ethernet cable connected to the internal passway of the BMS Panel.

HP recommends connecting the HP POD to your facility building management system (BMS), communicating through Ethernet cable connected to the internal passway of the BMS Panel. For more information, see Connecting the HP POD to the BMS (on page 40).

The standard BMS protocol, BACnet, is a data communication protocol for building automation and control networks.

A BMS offers:

- A supported communication interface that can monitor and control HP POD components remotely
- Immediate notification of all alarm messages
- Ability to manage and configure utility devices

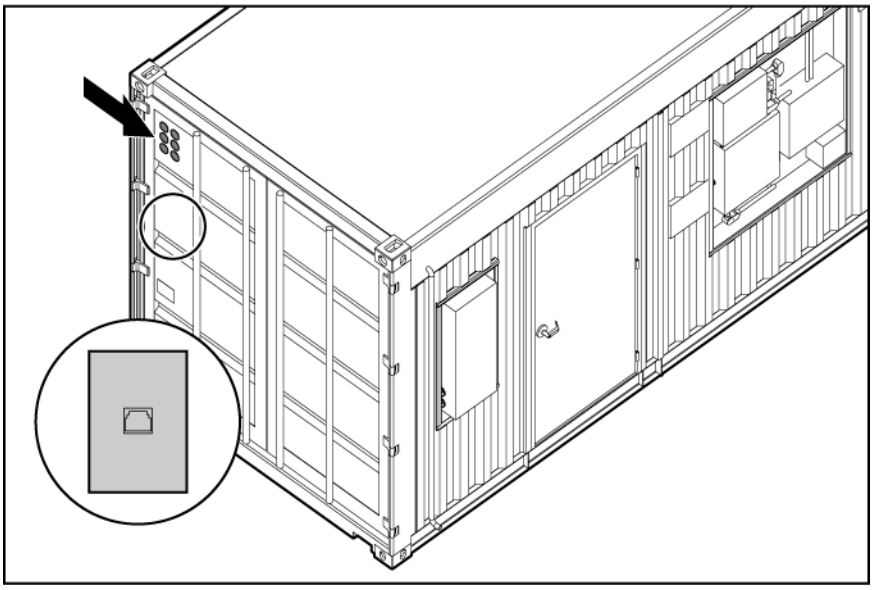
By connecting your HP POD to a BMS system, you can monitor:

- Cold and hot aisle temperatures
- Supply and return water temperatures
- Cooling water flow rate entering the HP POD
- Cooling tonnage
- Smoke alarms
- EPO alarms

For additional points that can be monitored, see the *I/O (Input/Output) Controls Points List* in the *Operations and Maintenance Manual* ("Component documentation" on page 9).

Connecting the HP POD to the BMS

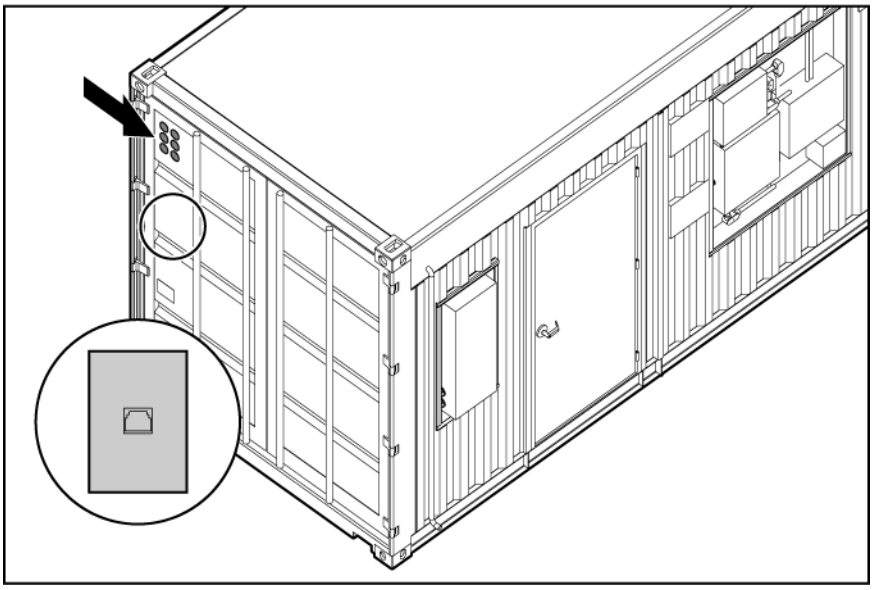
1. Install and configure the operating system (Microsoft® Windows® or Linux) on a designated management server.
2. Install the management software on the management server.
3. Connect the management servers to the building network.
4. Insert your BMS Ethernet cable through the IT portals on the left end of the HP POD.
5. Plug the Ethernet cable into the designated BMS jack on the interior of the HP POD.



For more information, see the junction control system documentation included in the *Operations & Maintenance Manual* ("Component documentation" on page 9).

Managing BMS settings from the HP POD

The BMS controls can be accessed from a laptop if necessary. To access the BMS using a laptop at the HP POD, connect an Ethernet cable between a laptop and the designated BMS jack on the interior of the HP POD.



BMS alarms

The alarms pertaining to the health of the HP POD and its components are relayed through the BMS.

Alarm	Meaning	Solution
Fan failure	One of the fans is not working.	If you are still within your service contract, contact HP service.
Sensor failure	One of the sensors is not working.	If you are still within your service contract, contact HP service.
Leak detection	The drain tray senses water.	Turn off the water flowing into your HP POD at the facility line. Turn off all IT components, so that the components do not overheat. If you are still within your service contract, contact HP service.
Change filter*	The return air filters are full.	Replace the return air filters.
High temperature	The cold aisle temperature has surpassed the set point temperature.	Check to make sure that you have water flowing into your HP POD and that the fans are blowing. If you are still within your service contract, contact HP service.
Low temperature	The cold aisle temperature is too low.	Check you HP POD components to make sure all components are operating as normal. If you are still within your service contract, contact HP service.
EPO	Someone has activated the EPO system and shut down the HP POD.	Follow emergency procedures. After the emergency is cleared, reset the EPO and other HP POD systems.

*The change filter alarm is only relayed to your BMS if you have the optional filter replacement sensor installed.

Safety and security alarms

Alarms pertaining to the safety of the HP POD are (optionally) relayed through your building fire and security dispatch.

Alarm	Meaning	Solution
Fire alarm*	A fire has been detected in the HP POD.	Activate the EPO. Follow emergency procedures for your facility.
Security alarm (optional)	There has been a security breach.	Follow emergency procedures for your facility.
EPO	Someone has activated the EPO system and shut down the HP POD.	Follow emergency procedures for your facility.

*The fire alarm is only relayed to your building fire and security dispatch if you have connected your facility to the fire alarm panel.

Fire alarm sequence of operations

If a fire alarm or manual pull station is activated, the HP POD follows this sequence of operations.

1. The HP POD sends an alarm signal to the building fire and security dispatch.
2. The AC unit shuts down.
3. The HP POD security lights flash and the horns sound the 30-second evacuation alarm.

4. After a 30-second delay, the HP POD releases the suppressant gas, if the optional fire suppressant system is installed.

Optional components

Additional insulation

You can choose to have additional insulated paint added to your HP POD prior to shipment. The additional insulation will enable the HP POD to function properly in temperatures as low as -29°C (-20°F).

Air filter sensor

The air filter sensor is an optional component that, if installed, alerts you to change your air filters. The sensors are located near each of the 12 air filters. If the air filters are full and should be replaced, an alert will be sent via your BMS.

Humidifier (optional)

If you choose to connect to the humidifier, it maintains the humidity within the HP POD within a set range, according to ASHRAE standards.

Maintaining the humidity helps to minimize static electricity within the HP POD.

For more information about the humidifier, see the product documentation included in the *Operations & Maintenance Manual* ("Component documentation" on page 9).

Fire protection system

The fire protection system is a HP POD self-contained system, with no connection to your BMS. The fire protection system consists of 12/30 pre-em novac, a clean agent fire suppressant, eliminating the need for additional water to be connected to the HP POD in case of a fire emergency.

HP POD security

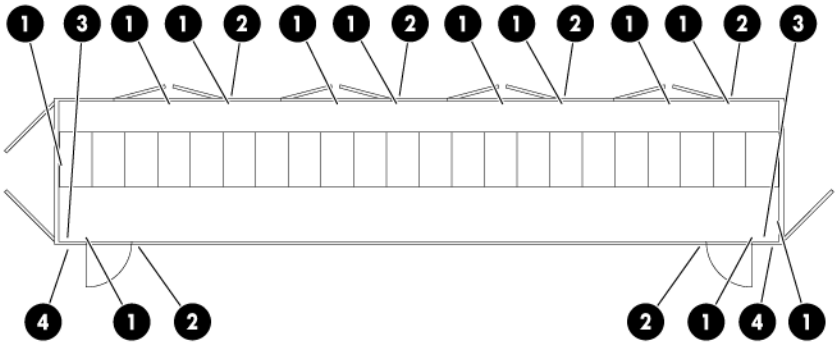
Routing raceways for the following security options are provided by HP and can be installed as a custom service option. You are responsible for providing additional hardware, cabling, and controllers to support these options.

Security options:

- Key lock hardware—Standard security provided
- Card reader security—Junction boxes provided at every entrance to upgrade security, if desired.
- Magnetic or electronic locks—Prewiring provided at every entrance to upgrade security, if desired. Magnetic or electronic locks are not provided.
- Internal/external cameras—Camera mounting locations are provided along with empty conduit and pull drag lines.

Each external panel is secured through key lock hardware.

The following locations have been prewired for your own security upgrades.



Callout	Description
1	Prewired junction box locations
2	Card reader locations
3	Internal camera locations
4	External camera locations

Transformers and switchboards

HP offers several transformers and switchboards to supply your power needs.

On-site connections include:

- From your main facility power to the primary side of the transformer
- From the transformer to the switchboard
- From the feeder breaker lugs within the switchboard assembly to the HP POD

The standard cables should allow for placing the transformer and switchboard approximately 3.0 m (10 ft) away from the HP POD. Installation costs assume that connections are within the 3.0 m (10 ft) recommendation. If you place the transformer and switchboard more than 3.0 m (10 ft) away from the HP POD, additional planning and costs are involved.

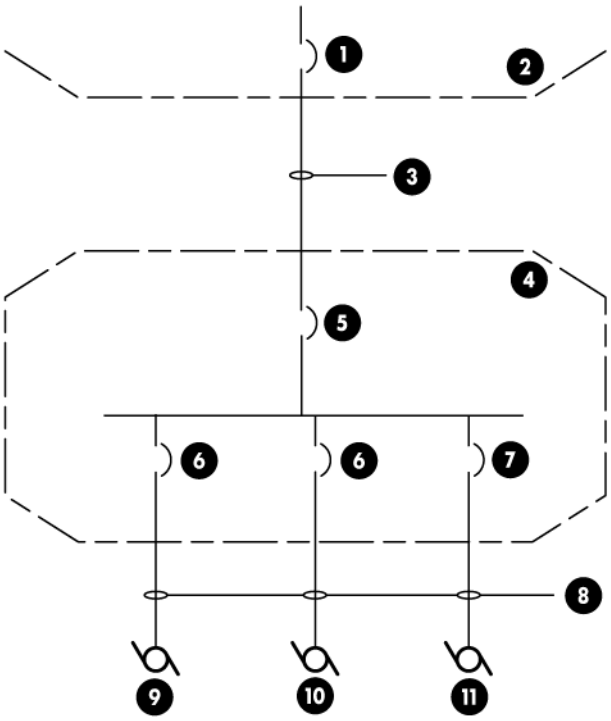
Water distribution kit

HP recommends using the optional water distribution kit to provide water to your HP POD. For more information about the kit, see Water distribution kit components ("Water distribution kit components (optional)" on page 16).

NOTE: The water distribution kit pipes are flushed prior to shipment.

The water distribution kit is enclosed within a 10 ft ISO container that includes internal lighting and heating. The heater comes equipped with a programmable thermostat that you can set to run as needed to ensure the water temperature inside does not drop below freezing.

Water distribution kit power requirements



Callout	Specification
1	30 AT, 30 AF, 3P
2	Within facility 480V, 3 phase power distribution equipment
3	(3)#10, (1)#10G, 1"C. Feeder sized on a maximum run of 100 ft
4	Motor controller at skid
5	30 AT, 30 AF, 3P
6	20 AT, 3P
7	15 AT, 3P
8	(3)#12, (1)#12G ¾"C
9	P–1
10	P–2
11	UH–1

Frequently asked questions

HP POD frequently asked questions

Question	Answer
Can I keep the HP POD on the trailer?	Yes, if you choose to lease the trailer from HP or if your purchase your own trailer and have the HP POD installed on your trailer prior to shipment. You must also: • Ensure that the site is stable and has been prepared correctly for the additional weight of the trailer. • Provide a work platform to access exterior panels.
What cooling capacity ranges are available in the HP POD?	The HP POD is capable of cooling rack-mounted components consuming up to 605 kW of electrical power.
What electrical power capacity ranges are available in the HP POD?	The low density HP POD is capable of powering components up to 450 kW of electrical power. The high density HP POD is capable of powering components up to 605 kW of electrical power.
Can the level of heat removal be regulated in proportion to the waste heat generated?	Yes, the control system automatically adjusts the air flow to remove heat generated in the HP POD.
How is water connected to the HP POD?	There are two options to connect water: • You directly connect your facility water to the HP POD, making sure the water meets the water requirements ("Water quality requirements" on page 30) for quality, temperature, and flow rate. • You connect your facility water to the water distribution kit, which is then connected to the HP POD through two 4-in 150-psi hoses.
Does the HP POD require maintenance?	Yes, general maintenance is outlined in this document. Contact HP service for additional information.
Does condensation form?	During normal operation some condensation might form, but the condensation does not reach any rack-mounted components or cause any damage. Excess condensation from the heat exchangers is collected and drained via three condensate drains ("HP POD drains" on page 28) across the rear of the HP POD. In most cases, the condensation evaporates prior to reaching the condensate drains.
How does the HP POD control humidity?	The relative humidity is maintained between 30–70%. If additional humidity is required, connect your facility water to the humidifier supply on the front of the HP POD.
Does the air flow within the HP POD produce static electricity?	The humidity of the HP POD is maintained between 30–70% to ensure that dangerous levels of static electricity cannot build.

Question	Answer
Is the HP POD weather resistant?	If there is an external leak, the HP POD is weatherproof and has sufficient protection against the encroachment of water inside the HP POD.
What happens if there is an internal leak?	If there is an internal leak, the water collects in the condensation drain pans or the water main drain pan. The additional water present in the condensation drain pan triggers a Leak Detection alarm, sent over the BMS.
What will happen if water stops flowing to the HP POD?	The building BMS receives a High Temperature alarm. An EPO will occur automatically if the hot aisle temperature exceeds 66°C (150°F). HP recommends shutting down all IT components or pressing any EPO button to manually power down the servers, to maintain server health, until the root problem can be solved.
At what smoke level will an alarm be issued?	You can set the four different ranges at which the ASSD panel smoke detector issues an alarm. For more information, see the smoke detector manual supplied with the HP POD.
Can I switch out my servers and other rack-mounted components?	The HP POD supports any IT equipment that uses front to rear air flow cooling to maintain thermal integrity. If you must remove a server or other rack-mounted component for any prolonged period, you must replace it with a similar component or a heavy-duty blanking panel so that the HP POD interior can maintain thermal integrity.
How will I be notified if there is an emergency in the HP POD?	The smoke alarm automatically detects incipient fires and activates several different types of fire alarms: • Visible—Internal and external HP POD strobes • Audible—Horn • Remote notification through the building fire alarm control panel (optional) Water emergencies are detected through the fire alarm control panel and drain trays, an alarm is initiated, and the building BMS is notified. If the fans are not functioning correctly, an alarm is initiated and the building BMS is notified.

Troubleshooting

HP POD troubleshooting

Issue	Resolution
The water is not flowing, or flowing too slowly.	Verify that all applicable valves are open. Inspect the water lines for blockage, unblock, or replace them as necessary.
The HP POD is overheating.	If the fan is not functioning, check the integrity of the electrical connection to the fan. If the electrical connection seems OK, replace the fan. If the fan is functioning, check for a kink or blockage in the water line to the heat exchanger. Contact HP service.
The strobe lights are flashing.	Either the EPO or the fire alarm system has been activated. Get out of the HP POD immediately and follow standard emergency procedures for your facility.
There is a leak inside the HP POD.	Locate and note the source of the leak. Prevent the leaking water from contacting any electrical equipment. Repair the leak as soon as possible.
There is no power to one rack.	1 Verify that the racks on either side of the rack have power. 2 Check the status of the busway dropbox for that rack. • If a breaker has tripped, reset the breaker box and verify that power has been restored to the rack. • If none of the busway dropbox breakers has tripped, check the status of the PDUs for the rack. If the input or output breakers have tripped, reset the PDU and verify that power has been restored to the rack. • If none of the breakers on the busway dropbox or PDUs have tripped, replace the busway dropbox.
There is no power to multiple racks.	1 Verify that the HP POD is receiving power. 2 Check the status of each of the electrical busway panels. If one of the breakers has tripped, reset the breaker and verify that power has been restored to the racks. 3 Check the status of the connection transformer and switchboard. If one of the breakers has tripped, reset the breaker and verify that power has been restored to the racks.
There is no power to the HP POD.	Check the status of the connection transformer and switchboard. If one of the breakers has tripped, reset the breaker and verify that power has been restored to the HP POD.

Specifications

HP POD specifications

Features	Specifications
Dimensions	40 ft x 8 ft x 9.5 ft
Maximum weight	30,000 lb (empty)- 101,000 lb (fully-loaded)
Maximum power/ cooling	• 450 kW (Standard POD) • 605 kW (High density POD)
Maximum rack quantity	22 racks
Rack Units (RU) per rack	50 RU
Rack Units (RU) maximum	1100 RU
Nominal power/ cooling per rack	25 kW
Maximum power/ cooling per rack	35 kW
Power input voltage	415 VAC, 3 Phase, 50/60 Hz, with neutral
Power distributed internally	Through 2 400A electrical busways 240/415 VAC, 50/60 Hz
Customer access	Double-door on one end Two 3 ft x 7 ft doors to the cold aisle (customer access) Four 6 ft x 7 ft doors to the hot aisle (rear component access)
Network supported	Bulk cable pass-through-fiber Bulk cable pass-through-copper (Optional) External rated DEMARC box

Electrical specifications

Panel information

Feature	Electrical busway panel	House panel
Number of panels	• 2 (Standard HP POD) • 3 (High density HP POD)	1
Amps (per panel)	400A	225A
Poles (per panel)	1	30–42
Phases	3	3

Circuit breaker information (Input)

Feature	Specification
Number of input circuit breakers	2: 1 per panel
Protection percentage	80%
Amps (per breaker)	400A

Fire alarm panel connections

The electrical layout of the fire alarm system is as described in the schematic drawing supplied with the HP POD.

Water specifications

Water supply specifications without a water distribution kit

Feature	Specification
Facility input temperature to HP POD	12° to 24°C (55° to 75°F)
Operating pressure	137,895 to 172,369 Pa (20 to 25 psi)
Rated pressure max	1,034,213 Pa (150 psi)
HP POD pressure drop	110,316 Pa (16 psi)
HP POD water flow rate	908.5 l/min (240 gal/min)
Cooling water supply and return connections	(2) 10.16 cm (4 inch) 150# flange
Humidifier	3.79 l/hr (1 gal/hr) domestic water from an alternate supply source

Water supply specifications with a water distribution kit

Feature	Specification
Facility input temperature to the water distribution kit	4° to 10°C (40° to 50°F)
Water distribution kit temperature output to the HP POD	12° to 24°C (55° to 75°F)
Operating pressure	137,895 to 172,369 Pa (20 to 25 psi)
Rated pressure max	1,034,213 Pa (150 psi)
HP POD pressure drop	110,316 Pa (16 psi)
Water distribution kit pressure drop	34,474 Pa (5 psi) max
Water flow rate to the water distribution kit	757 to 1,893 l/min (200 to 500 gal/min) based on a facility operating delta T range of 6°to 12°C (10°–20°F)
Water distribution kit flow rate to the HP POD	908.5 l/min (240 gal/min)
Cooling water supply and return connections	(2) 10.16 cm (4 inch) 150# flange

Feature	Specification
Humidifier	3.79 l/hr (1 gal/hr) domestic water from an alternate supply source

Rack specifications

Standard HP POD racks (AN982A)

Feature	Specification
U height	50U
Width	56-mm
Depth	1,000-mm
Maximum load weight	3,000 lb

International shock-mounted HP POD racks (AT052A)

Feature	Specification
U height	46U
Width	56-mm
Depth	1,000-mm
Maximum load weight	2,760 lb

Thermal and air flow performance

Maximum thermal and air flow performance parameters	HP POD specification
Air temperature—Inlet to rack-mounted components	Cold aisle setpoint temperature in BMS
Chilled water temperature	12°–19°C (55°–65°F)
Total rack-mounted component air flow	Variable as required to maintain cold aisle setpoint temperature
Chilled water flow rate	• 240 gal/min (908 l/min) without utility module • 280 gal/min (1,060 l/min) with utility module
Chilled water pressure differential at flow needed to meet thermal specifications	5 psi max
Server heat load	• 450 kW standard HP POD • 605 kW high density HP POD

Environmental specifications

Features	Specifications
Operating temperature	-18°C to 54°C (0°F to 130°F)
Non-operating temperature*	2°C to 54°C (35°F to 130°F)
Transit temperature**	-30°C to 60°C (-22°F to 140°F), up to 72 hours
Operating humidity	• 15% to 80% relative noncondensing • 26°C (79°F) maximum wet bulb temperature
Non-operating humidity*	• 5 to 95% relative noncondensing • 39°C (102°F) maximum wet bulb temperature
Operating altitude	-76.2 to 3,048 m (-250 to 10,000 ft)
Non-operating altitude	-76.2 to 9,144 m (-250 to 30,000 ft)

*For non-operating specifications, consider the temperature of computer and IT equipment inside the HP POD.
**The HP POD must be drained before it is moved to a new location.
For areas prone to freezing, consult HP for applicable operating solutions and evaluate water lines as described in the Frost damage (on page 31) section of this document.

Water distribution kit specifications

Feature	Specification
Dimensions	10 ft x 8 ft x 9 ft
Tank capacity	7.8 gal
Pumps electrical	480V, 3-phase, 60 Hz
Pumps flow	240 gal/min
Chemical pot feeder capacity	10 gal

For more information, see Water specifications (on page 51).

Maintenance

Periodic maintenance

Perform periodic inspections of the POD to ensure there is no sign of overheating. During periodic inspections, pay special attention to electrical connections and wiring.

Electrical busway maintenance

Periodically tighten the electrical busway connections. HP recommends tightening the electrical busway connections every six months.

Inspect the busway drop boxes for loose connections, and tighten if necessary.

Water system maintenance

HP does not maintain your water system quality.

Consult a water treatment specialist to perform the following maintenance:

Flush the HP POD

How often you must flush the HP POD depends on how often you shutdown the HP POD and the water quality.

Maintain water quality

The water treatment specialist should periodically take a water sample and add new chemical treatments to the HP POD water or water distribution kit as needed to maintain the specified water quality ("Water quality requirements" on page 30).

Air filter replacement

There are twelve 14 in x 36 in x 1 in air filters inside the HP POD.

If you have the optional air filter sensor (on page 44) installed, you will be notified through your BMS when you need to change a filter.

If you do not have the sensor installed, HP recommends periodically inspecting and changing each air filter.

Air and water heat exchanger maintenance

The air and water heat exchanger requires no maintenance. If particulates are present in the cooling water, a filter must be fitted immediately upstream from the water inlet fittings. Check the functionality of the condensation drainage system regularly. Regularly perform visual inspections for leaks (annually).

Before you contact HP

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For the name of the nearest HP authorized reseller:

- See the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html).

For HP technical support:

- In the United States, for contact options see the Contact HP United States webpage (http://welcome.hp.com/country/us/en/contact_us.html). To contact HP by phone:
  - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
  - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website (http://www.hp.com/hps).
- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html).

Regulatory compliance notices

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

Federal Communications Commission notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian notice

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union regulatory notice

This product complies with the following EU Directives:

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- Machinery Directive 98/37/EEC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:

CE

This marking is valid for non-Telecom products and EU harmonized Telecom products (e.g. Bluetooth).

CE(xxxx*)!

This marking is valid for EU non-harmonized Telecom products.

*Notified body number (used only if applicable—refer to the product label)

Hewlett-Packard GmbH, HQ-TRE, Herrenberger Strasse 140, 71034 Boeblingen, Germany

Disposal of waste equipment by users in private households in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

BSMI notice

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Chinese notice

Class A equipment

声明
此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取可行的措施。

Korean class A notice

A급 기기 (업무용 방송통신기기)	이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

Japanese class A notice

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Acronyms and abbreviations

AHJ

Authority Having Jurisdiction

ASHRAE

American Society of Heating, Refrigerating and Air-Conditioning Engineers

ASSD

air sampling smoke detector

BMS

building management system

BPMS

branch power monitor system

EPMS

electrical power monitor system

EPO

emergency power off

FAQ

frequently asked questions

FC

fan control

HEX

heat exchanger

ISO

International Organization for Standardization

MCS

modular cooling system

NEMA

National Electrical Manufacturers Association

PDU

power distribution unit

POD

Performance-Optimized Datacenter

UPS

uninterruptible power system

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